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None

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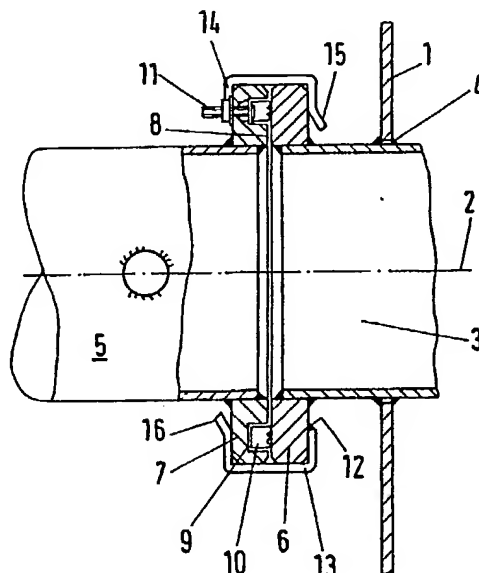
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(54) Rotary drum filter mounting

(57) A filter drum (not shown) has an axially extending discharge pipe 5 for the filtrate and is located within a housing 1, which rotates with the drum and carries a duct 3 which leads to outside the housing. Duct 3 and pipe 5 carry respective flanges 6,7 between which is an inflatable seal 10. The lower half of flange 6 carries brackets 13 which embrace flange 7, while the upper half of flange 7 carries brackets 14 which embrace flange 6. When seal 10 is deflated there is sufficient slack to allow the drum and pipe 5 to be lifted vertically from the housing, breaking the coupling with duct 3.

Fig.1



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Fig.1

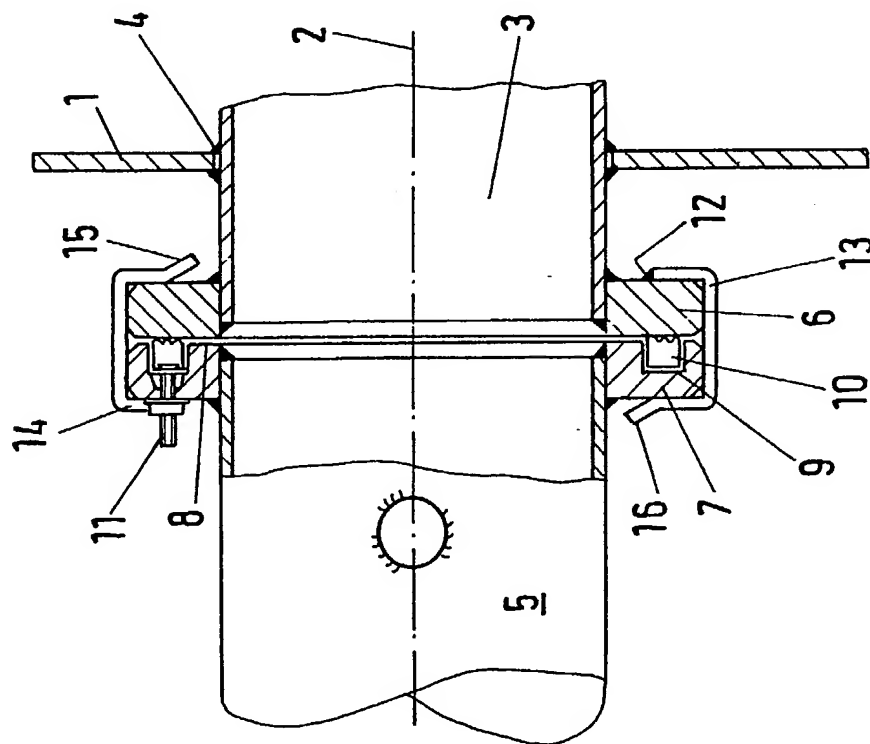
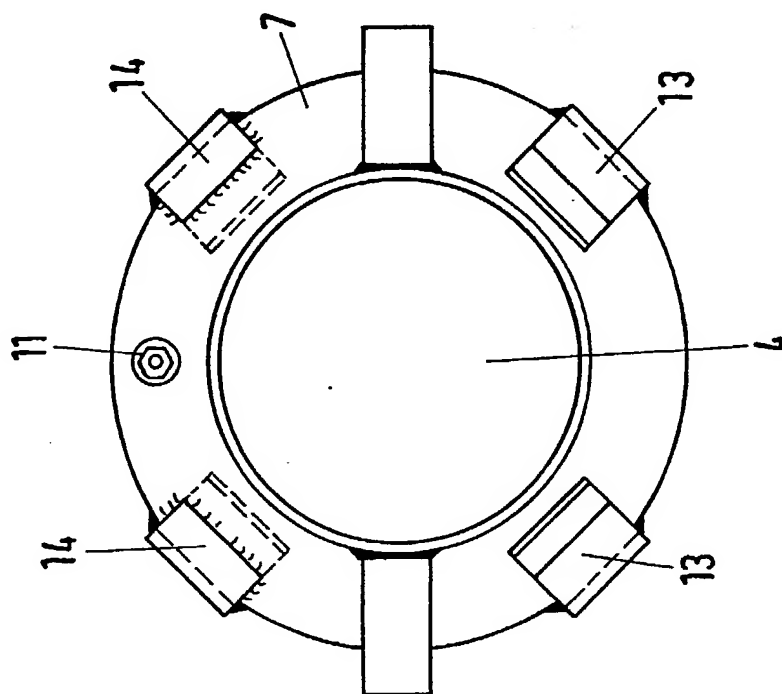


Fig.2



SIEVE DRUM FILTER

The invention relates to a drum filter of the type having a sieve drum which is disposed in a container for containing the liquid to be filtered. In
5 such a filter a filtrate removal pipe extends laterally from the drum to a suction connection through which filtered liquid drawn inwardly through the sieve drum is pumped away.

10 In typical filters of the above type, the only path for liquid from the container to the suction connection is through the wall of the sieve drum, and the drum or the drum and container together are rotated about the axis of the drum and the removal pipe as the
15 filter is used. The filter is normally used with this axis horizontal.

Filters of the above type are used, for example, for purifying contaminated liquids, such as emulsions and oils, and serve to separate solid particles which occur in metal processing operations such as turning,
20 drilling, milling, grinding. The sieve drum is usually closed at both ends and disposed in a container containing the liquid to be filtered. The filtrate is drawn out of the interior of the sieve drum by suction through a central connecting branch by means of a pump,
25 the liquid being drawn from the outside to the inside through the screen lining of the sieve drum, and contaminating particles being retained on the outer periphery of the sieve drum.

Drum filters of the kind to which this invention
30 broadly relates are described in US patent No. 4,421,645. They are of relatively simple construction and are easy to clean by with scrapers to remove the filter cake which forms on the outside of the drum. Nevertheless, it is necessary to replace the entire

sieve drum from time to time in order to service and clean it.

5 In known drum filters, the filtrate removal pipe is provided on the sieve drum which consists of a tubular sealing member which tapers towards its end. To this sealing member there is connected a suction connection provided with a corresponding internal cone, the connection being produced by moving the sieve drum into the internal cone in the axial direction and
10 bracing it therein. It will be understood that the horizontal movement of the sieve drum before lifting out necessitates additional expenditure in terms of construction, and the conical shape of the filtrate removal pipe involves the danger that particles of dirt
15 will lodge between the cone surfaces, complicating the creation of an hermetic seal at the suction connection.

The present invention is directed particularly at the connection between the filtrate removal pipe and the suction connection. It seeks to provide a simple
20 connection which permits both easy replacement of the drum filter and an absolutely hermetic connection in the operating state. To this end, the invention provides a drum filter having a container for liquid to be filtered, a sieve drum disposed therein and having an axis, a filtrate removal pipe extending along said axis
25 from the drum to a connection with a discharge duct, which connection comprises outwardly directed flanges at juxtaposed ends of the pipe and duct; at least one first bracket mounted on the discharge duct on one side of said axis enclosing the pipe flange adjacent and in
30 alignment with the duct flange; at least one second bracket mounted on the removal pipe on the other side of said axis enclosing the duct flange adjacent and in alignment with the pipe flange; an annular seal disposed
35 in a recess in one of the flanges; and means for

actuating the seal to close the connection between the flanges, whereby de-actuation of the seal assembly enables the drum and removal pipe to be moved in a plane substantially perpendicular to said axis into and out of registration with the discharge duct at the connection.

The invention also provides a sieve drum for use in the above filter having a filtrate removal pipe extending laterally therefrom, the pipe having an outwardly directed flange at the distal end of the pipe for registration with a complementary flange of a said discharge duct; and at least one bracket mounted on one side of the pipe and extending over and beyond the pipe flange to enclose a said duct flange upon registration therewith.

In the assembled filter, each bracket or clamp fits over both flanges of the suction connection. The connection can then be sealed off by means of a pneumatic tubular seal inserted in a recess in one of the flanges which, upon actuation, urges the flanges apart and against the respective brackets or clamps.

The invention permits easy insertion and removal of the sieve drum by simply releasing the seal and withdrawing the drum and removal pipe in a single direction or plane. Little or no movement of the drum directly away from the discharge duct is required. When the axis of the removal pipe is substantially horizontal, as is preferred, then the entire sieve drum can be lifted out vertically upwards.

In preferred embodiments of the invention, provision is made for whichever side or sides of the brackets or clamps are free, to run obliquely outwards as an insertion aid for the connection flanges upon installation of the drum. Insertion is thus facilitated by appropriate sloping of the free ends of the clamps in conjunction with optionally sloping flange corners, the

slight play serving for easy insertion, but being able to be bridged easily by a suitable pneumatic tubular seal.

5 An embodiment of the invention will now be described by way of example and with reference to the accompanying drawings wherein:

Figure 1 shows a cross-section through the filtrate removal pipe and suction connection; and

10 Figure 2 shows an end view of the connection in Figure 1.

15 In Figure 1, the wall of a container into which is inserted the sieve drum (not shown) is marked 1. In this container wall, a suction duct 3 is welded coaxially to the axis of rotation 2 of the sieve drum at 4, to the free end of which connection there is a connection flange 6, likewise welded coaxially to the axis of rotation 2 of the sieve drum.

20 In the assembled state the filtrate removal pipe 5 is provided coaxially to the suction connection 3, which pipe leads to the pump for the filtered liquid (not shown). The filtrate removal pipe 5 is also provided with a flange 7 which surrounds it coaxially and is welded tightly to the end thereof.

25 A groove-shaped recess 9 is located on the end face 8 of the connection flange 7 which faces the connection flange 6, into which recess the pneumatic tubular seal 10 is inserted, which seal can be loaded and unloaded via the connection 11.

30 In order to be able to hold the flanges 6 and 7 in the assembled state in the axial direction, a bracket or clamp 13 is welded to the connection flange 6 at 12 which fits over the connection flange 7 with slight

lateral play. A similar clamp 14 is welded tightly to the connection flange 7 and fits under the connection flange 6 in the upper region with slight lateral play. The attachment of the clamps to one connection flange 7 and to the other connection flange 6, which is unilateral but mirror-inverted in each case, permits vertical lifting out of the sieve drum with the filtrate removal pipe 4 from the container 1, the clamp 14 which is attached to the connection flange 7 also being lifted out upwards, while the clamp 13, which is attached to the fixed connection flange of the suction connection 3, remains in the container.

When introducing the sieve drum, the sloping edges 15 and 16 on the clamps 14 and 13 are helpful; they guide the connection flange 7 into the opposite position to the connection flange 6.

As is shown in Figure 2, it is recommended to provide at least two clamps each on the upper and lower halves of the connection flanges 6 and 7. This determines the position of the connection flanges 6 and 7 with respect to each other, so that the tubular seal 10 can be pressurised simply by acting on the pneumatic connection 11, in order to produce a seal of the flanges against each other.

Claims

1. A drum filter having a container for liquid to be filtered, a sieve drum disposed therein and having an axis, a filtrate removal pipe extending along said axis from the drum to a connection with a discharge duct, which connection comprises outwardly directed flanges at juxtaposed ends of the pipe and duct; at least one first bracket mounted on the discharge duct on one side of said axis enclosing the pipe flange adjacent and in alignment with the duct flange; at least one second bracket mounted on the removal pipe on the other side of said axis enclosing the duct flange adjacent and in alignment with the pipe flange; an annular seal disposed in a recess in one of the flanges; and means for actuating the seal to close the connection between the flanges, whereby de-actuation of the seal assembly enables the drum and removal pipe to be moved in a plane substantially perpendicular to said axis into and out of registration with the discharge duct at the connection.

2. A drum filter according to Claim 1 wherein the annular seal is a pneumatic seal.

3. A drum filter according to Claim 1 or Claim 2 wherein said at least one first bracket is mounted on the duct flange and said at least one second bracket is mounted on the pipe flange.

4. A drum filter according to any preceding Claim wherein the connection comprises at least two said first brackets.

5. A drum filter according to any preceding Claim wherein the unmounted end of each bracket has an inclined surface for guiding the pipe flange into registration with the discharge duct.

6. A drum filter according to any preceding Claim wherein the discharge duct is fixedly mounted in a wall of the container.

5 7. A drum filter according to any preceding Claim wherein said axis of the sieve drum is substantially horizontal, and said one side is below said axis.

8. A drum filter substantially as described herein with reference to the accompanying drawings.

10 9. A sieve drum for a drum filter according to any preceding Claim having a filtrate removal pipe extending laterally therefrom, the pipe having an outwardly directed flange at the distal end of the pipe for registration with a complementary flange of a said discharge duct; and at least one bracket mounted on one
15 side of the pipe and extending over and beyond the pipe flange to enclose a said duct flange upon registration therewith.

20 10. A sieve drum according to Claim 9 wherein an annular recess is formed in the axial face of the pipe flange directed away from the drum, with means coupled thereto for actuating a seal therein against the juxtaposed face of a said duct flange when in registration therewith.

25 11. A sieve drum substantially as described herein with reference to the accompanying drawings.